



SEQUENCE LISTING

<110> Aventis Pasteur, Ltd.

<120> Tumor Antigen BFA-5 for Prevention and/or Treatment of Cancer

<130> API-03-03-US

<150> 60/462,945

<151> 2004-04-15

<160> 106

<170> PatentIn version 3.2

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<212> DNA

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Phe Ser Phe Pro Ala Ala Gly Gly Val Cys Glu Pro Leu Lys Ser Pro
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Gly Asp Ser Leu Glu Thr Lys Glu Asp Gln Lys Met Ser Pro Lys Ala
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Thr Glu Glu Thr Gly Gln Ala Gln Ser Gly Gln Ala Asn Cys Gln Gly
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Gly Gly Val Arg Leu Asn Lys Ser Lys Thr Asp Leu Leu Val Asn Asp
 195 200 205

Asn Pro Asp Pro Ala Pro Leu Ser Pro Glu Leu Gln Asp Phe Lys Cys
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Asn Ile Cys Gly Tyr Gly Tyr Tyr Gly Asn Asp Pro Thr Asp Leu Ile
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Lys His Phe Arg Lys Tyr His Leu Gly Leu His Asn Arg Thr Arg Gln
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Asp Ala Glu Leu Asp Ser Lys Ile Leu Ala Leu His Asn Met Val Gln
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Phe Ser His Ser Lys Asp Phe Gln Lys Val Asn Arg Ser Val Phe Ser

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Arg Lys Thr Pro Asp Cys Gln Gly Asn Thr Lys Tyr Phe Arg Cys Lys 325 330 335		
Phe Cys Asn Phe Thr Tyr Met Gly Asn Ser Ser Thr Glu Leu Glu Gln 340 345 350		
His Phe Leu Gln Thr His Pro Asn Lys Ile Lys Ala Ser Leu Pro Ser 355 360 365		
Ser Glu Val Ala Lys Pro Ser Glu Lys Asn Ser Asn Lys Ser Ile Pro 370 375 380		
Ala Leu Gln Ser Ser Asp Ser Gly Asp Leu Gly Lys Trp Gln Asp Lys 385 390 395 400		
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Tyr Tyr Trp Cys Lys Phe Cys Ser Phe Ser Cys Glu Ser Ser Ser Ser 435 440 445		
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Pro Leu Leu Arg His Tyr Gln Gln Leu His Asn Ile His Lys Cys Thr
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Ile Lys His Cys Pro Phe Cys Pro Arg Gly Leu Cys Ser Pro Glu Lys
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His Leu Gly Glu Ile Thr Tyr Pro Phe Ala Cys Arg Lys Ser Asn Cys
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Asp Val Asp Val Leu Leu Phe His Tyr Glu Ser Val His Glu Ser Gln
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Val Glu Ala Ala His Leu Ala Arg Pro Ile Tyr Gly Leu Ala Val Glu
835 840 845

Thr Lys Gly Phe Leu Gln Gly Ala Pro Ala Gly Gly Glu Lys Ser Gly
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Ala Leu Pro Gln Gln Tyr Pro Ala Ser Gly Glu Asn Lys Ser Lys Asp
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Glu Ser Gln Ser Leu Leu Arg Arg Arg Arg Gly Ser Gly Val Phe Cys
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Gly Gly Tyr Val Cys Asn Ala Cys Gly Leu Tyr Gln Lys Leu His Ser
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Thr Pro Arg Pro Leu Asn Ile Ile Lys Gln Asn Asn Gly Glu Gln Ile
930 935 940

Ile Arg Arg Arg Thr Arg Lys Arg Leu Asn Pro Glu Ala Leu Gln Ala
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Met Ser Cys His Gly Asp Ser	Gly Pro Phe Gln Cys	Ser Ile Cys		
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Gln His Leu Cys Thr Asp Lys	Tyr Asp Phe Thr Thr	His Ile Gln		
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Cys Lys Ile Lys Ala Leu Arg Ala Lys Thr Asn Thr Tyr Ile Lys Thr
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Arg Glu Glu Ile Glu Thr His Ile Ala Val Arg Thr Gly Lys Ile Leu
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Glu Tyr Asn Asn Glu Asn Asp Phe Leu Ala Gly Ser Pro Asp Ala Ala
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Ile Asp Ser Arg Tyr Ser Asp Ala Trp Arg Val His Gln Pro Gly Cys
 195 200 205

Lys Pro Leu Ser Thr Phe Arg Gln Asn Ser Leu Gly Cys Ile Gly Glu
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Cys Gly Val Asp Ser Gly Phe Glu Ala Pro Arg Leu Gly Glu Gln Gly
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Gly Asp Phe Gly Tyr Gly Gly Tyr Leu Phe Pro Gly Tyr Gly Val Gly
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Lys Gln Asp Val Tyr Tyr Gly Val Ala Glu Thr Ser Pro Pro Leu Trp
 260 265 270

Ala Gly Gln Glu Asn Ala Thr Pro Thr Ser Val Leu Phe Ser Ser Ala
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cttcaaaaag atcactgtga acaacgtaca ggaaaaatgg aacaaatgaa aaagaagttt	2820
tgtgtactga aaaagaaact gtcagaagca aaagaaataa aatcacagtt agagaaccaa	2880
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gagcagcata ggaaagagtt agaagtgaaa caacaacttg aacaggctct cagaatacaa	3060
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cttgagagga aaatgcaaca tcatctccta aaagagaaaa atgaggagat atttaattac	3960
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Lys Arg Thr Ala Leu His Trp Ala Cys Val Asn Gly His Glu Glu Val

20					25					30					
Val	Thr	Phe	Leu	Val	Asp	Arg	Lys	Cys	Gln	Leu	Asp	Val	Leu	Asp	Gly
		35					40					45			
Glu	His	Arg	Thr	Pro	Leu	Met	Lys	Ala	Leu	Gln	Cys	His	Gln	Glu	Ala
	50					55					60				
Cys	Ala	Asn	Ile	Leu	Ile	Asp	Ser	Gly	Ala	Asp	Ile	Asn	Leu	Val	Asp
65				70					75					80	
Val	Tyr	Gly	Asn	Met	Ala	Leu	His	Tyr	Ala	Val	Tyr	Ser	Glu	Ile	Leu
			85						90					95	
Ser	Val	Val	Ala	Lys	Leu	Leu	Ser	His	Gly	Ala	Val	Ile	Glu	Val	His
			100					105					110		
Asn	Lys	Ala	Ser	Leu	Thr	Pro	Leu	Leu	Leu	Ser	Ile	Thr	Lys	Arg	Ser
	115						120						125		
Glu	Gln	Ile	Val	Glu	Phe	Leu	Leu	Ile	Lys	Asn	Ala	Asn	Ala	Asn	Ala
	130					135					140				
Val	Asn	Lys	Tyr	Lys	Cys	Thr	Ala	Leu	Met	Leu	Ala	Val	Cys	His	Gly
145					150					155					160
Ser	Ser	Glu	Ile	Val	Gly	Met	Leu	Leu	Gln	Gln	Asn	Val	Asp	Val	Phe
			165						170					175	
Ala	Ala	Asp	Ile	Cys	Gly	Val	Thr	Ala	Glu	His	Tyr	Ala	Val	Thr	Cys
			180					185					190		
Gly	Phe	His	His	Ile	His	Glu	Gln	Ile	Met	Glu	Tyr	Ile	Arg	Lys	Leu
	195						200					205			
Ser	Lys	Asn	His	Gln	Asn	Thr	Asn	Pro	Glu	Gly	Thr	Ser	Ala	Gly	Thr
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Pro	Asp	Glu	Ala	Ala	Pro	Leu	Ala	Glu	Arg	Thr	Pro	Asp	Thr	Ala	Glu
225					230					235					240
Ser	Leu	Val	Glu	Lys	Thr	Pro	Asp	Glu	Ala	Ala	Pro	Leu	Val	Glu	Arg
			245						250					255	

Thr Pro Asp Thr Ala Glu Ser Leu Val Glu Lys Thr Pro Asp Glu Ala
 260 265 270

Ala Ser Leu Val Glu Gly Thr Ser Asp Lys Ile Gln Cys Leu Glu Lys
 275 280 285

Ala Thr Ser Gly Lys Phe Glu Gln Ser Ala Glu Glu Thr Pro Arg Glu
 290 295 300

Ile Thr Ser Pro Ala Lys Glu Thr Ser Glu Lys Phe Thr Trp Pro Ala
 305 310 315 320

Lys Gly Arg Pro Arg Lys Ile Ala Trp Glu Lys Lys Glu Asp Thr Pro
 325 330 335

Arg Glu Ile Met Ser Pro Ala Lys Glu Thr Ser Glu Lys Phe Thr Trp
 340 345 350

Ala Ala Lys Gly Arg Pro Arg Lys Ile Ala Trp Glu Lys Lys Glu Thr
 355 360 365

Pro Val Lys Thr Gly Cys Val Ala Arg Val Thr Ser Asn Lys Thr Lys
 370 375 380

Val Leu Glu Lys Gly Arg Ser Lys Met Ile Ala Cys Pro Thr Lys Glu
 385 390 395 400

Ser Ser Thr Lys Ala Ser Ala Asn Asp Gln Arg Phe Pro Ser Glu Ser
 405 410 415

Lys Gln Glu Glu Asp Glu Glu Tyr Ser Cys Asp Ser Arg Ser Leu Phe
 420 425 430

Glu Ser Ser Ala Lys Ile Gln Val Cys Ile Pro Glu Ser Ile Tyr Gln
 435 440 445

Lys Val Met Glu Ile Asn Arg Glu Val Glu Glu Pro Pro Lys Lys Pro
 450 455 460

Ser Ala Phe Lys Pro Ala Ile Glu Met Gln Asn Ser Val Pro Asn Lys
 465 470 475 480

Ala Phe Glu Leu Lys Asn Glu Gln Thr Leu Arg Ala Asp Pro Met Phe
485 490 495

Pro Pro Glu Ser Lys Gln Lys Asp Tyr Glu Glu Asn Ser Trp Asp Ser
500 505 510

Glu Ser Leu Cys Glu Thr Val Ser Gln Lys Asp Val Cys Leu Pro Lys
515 520 525

Ala Thr His Gln Lys Glu Ile Asp Lys Ile Asn Gly Lys Leu Glu Glu
530 535 540

Ser Pro Asn Lys Asp Gly Leu Leu Lys Ala Thr Cys Gly Met Lys Val
545 550 555 560

Ser Ile Pro Thr Lys Ala Leu Glu Leu Lys Asp Met Gln Thr Phe Lys
565 570 575

Ala Glu Pro Pro Gly Lys Pro Ser Ala Phe Glu Pro Ala Thr Glu Met
580 585 590

Gln Lys Ser Val Pro Asn Lys Ala Leu Glu Leu Lys Asn Glu Gln Thr
595 600 605

Trp Arg Ala Asp Glu Ile Leu Pro Ser Glu Ser Lys Gln Lys Asp Tyr
610 615 620

Glu Glu Asn Ser Trp Asp Thr Glu Ser Leu Cys Glu Thr Val Ser Gln
625 630 635 640

Lys Asp Val Cys Leu Pro Lys Ala Ala His Gln Lys Glu Ile Asp Lys
645 650 655

Ile Asn Gly Lys Leu Glu Gly Ser Pro Val Lys Asp Gly Leu Leu Lys
660 665 670

Ala Asn Cys Gly Met Lys Val Ser Ile Pro Thr Lys Ala Leu Glu Leu
675 680 685

Met Asp Met Gln Thr Phe Lys Ala Glu Pro Pro Glu Lys Pro Ser Ala
690 695 700

Phe Glu Pro Ala Ile Glu Met Gln Lys Ser Val Pro Asn Lys Ala Leu
705 710 715 720

Glu Leu Lys Asn Glu Gln Thr Leu Arg Ala Asp Glu Ile Leu Pro Ser
725 730 735

Glu Ser Lys Gln Lys Asp Tyr Glu Glu Ser Ser Trp Asp Ser Glu Ser
740 745 750

Leu Cys Glu Thr Val Ser Gln Lys Asp Val Cys Leu Pro Lys Ala Thr
755 760 765

His Gln Lys Glu Ile Asp Lys Ile Asn Gly Lys Leu Glu Glu Ser Pro
770 775 780

Asp Asn Asp Gly Phe Leu Lys Ala Pro Cys Arg Met Lys Val Ser Ile
785 790 795 800

Pro Thr Lys Ala Leu Glu Leu Met Asp Met Gln Thr Phe Lys Ala Glu
805 810 815

Pro Pro Glu Lys Pro Ser Ala Phe Glu Pro Ala Ile Glu Met Gln Lys
820 825 830

Ser Val Pro Asn Lys Ala Leu Glu Leu Lys Asn Glu Gln Thr Leu Arg
835 840 845

Ala Asp Gln Met Phe Pro Ser Glu Ser Lys Gln Lys Lys Val Glu Glu
850 855 860

Asn Ser Trp Asp Ser Glu Ser Leu Arg Glu Thr Val Ser Gln Lys Asp
865 870 875 880

Val Cys Val Pro Lys Ala Thr His Gln Lys Glu Met Asp Lys Ile Ser
885 890 895

Gly Lys Leu Glu Asp Ser Thr Ser Leu Ser Lys Ile Leu Asp Thr Val
900 905 910

His Ser Cys Glu Arg Ala Arg Glu Leu Gln Lys Asp His Cys Glu Gln
915 920 925

Arg Thr Gly Lys Met Glu Gln Met Lys Lys Lys Phe Cys Val Leu Lys

930

935

940

Lys Lys Leu Ser Glu Ala Lys Glu Ile Lys Ser Gln Leu Glu Asn Gln
 945 950 955 960

Lys Val Lys Trp Glu Gln Glu Leu Cys Ser Val Arg Leu Thr Leu Asn
 965 970 975

Gln Glu Glu Glu Lys Arg Arg Asn Ala Asp Ile Leu Asn Glu Lys Ile
 980 985 990

Arg Glu Glu Leu Gly Arg Ile Glu Glu Gln His Arg Lys Glu Leu Glu
 995 1000 1005

Val Lys Gln Gln Leu Glu Gln Ala Leu Arg Ile Gln Asp Ile Glu
 1010 1015 1020

Leu Lys Ser Val Glu Ser Asn Leu Asn Gln Val Ser His Thr His
 1025 1030 1035

Glu Asn Glu Asn Tyr Leu Leu His Glu Asn Cys Met Leu Lys Lys
 1040 1045 1050

Glu Ile Ala Met Leu Lys Leu Glu Ile Ala Thr Leu Lys His Gln
 1055 1060 1065

Tyr Gln Glu Lys Glu Asn Lys Tyr Phe Glu Asp Ile Lys Ile Leu
 1070 1075 1080

Lys Glu Lys Asn Ala Glu Leu Gln Met Thr Leu Lys Leu Lys Glu
 1085 1090 1095

Glu Ser Leu Thr Lys Arg Ala Ser Gln Tyr Ser Gly Gln Leu Lys
 1100 1105 1110

Val Leu Ile Ala Glu Asn Thr Met Leu Thr Ser Lys Leu Lys Glu
 1115 1120 1125

Lys Gln Asp Lys Glu Ile Leu Glu Ala Glu Ile Glu Ser His His
 1130 1135 1140

Pro Arg Leu Ala Ser Ala Val Gln Asp His Asp Gln Ile Val Thr
 1145 1150 1155

Ser Arg Lys Ser Gln Glu Pro Ala Phe His Ile Ala Gly Asp Ala
1160 1165 1170

Cys Leu Gln Arg Lys Met Asn Val Asp Val Ser Ser Thr Ile Tyr
1175 1180 1185

Asn Asn Glu Val Leu His Gln Pro Leu Ser Glu Ala Gln Arg Lys
1190 1195 1200

Ser Lys Ser Leu Lys Ile Asn Leu Asn Tyr Ala Gly Asp Ala Leu
1205 1210 1215

Arg Glu Asn Thr Leu Val Ser Glu His Ala Gln Arg Asp Gln Arg
1220 1225 1230

Glu Thr Gln Cys Gln Met Lys Glu Ala Glu His Met Tyr Gln Asn
1235 1240 1245

Glu Gln Asp Asn Val Asn Lys His Thr Glu Gln Gln Glu Ser Leu
1250 1255 1260

Asp Gln Lys Leu Phe Gln Leu Gln Ser Lys Asn Met Trp Leu Gln
1265 1270 1275

Gln Gln Leu Val His Ala His Lys Lys Ala Asp Asn Lys Ser Lys
1280 1285 1290

Ile Thr Ile Asp Ile His Phe Leu Glu Arg Lys Met Gln His His
1295 1300 1305

Leu Leu Lys Glu Lys Asn Glu Glu Ile Phe Asn Tyr Asn Asn His
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Leu Lys Asn Arg Ile Tyr Gln Tyr Glu Lys Glu Lys Ala Glu Thr
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Glu Asn Ser
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Lys Arg Thr Ala Leu His Trp
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Thr Ser Glu Lys Phe Thr Trp Pro Ala Lys Gly Arg Pro Arg Lys Ile
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Asp Glu Ile Leu Pro Ser Glu Ser Lys Gln Lys Asp Tyr Glu Glu Asn
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Ser Trp Asp Thr Glu Ser Leu
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Arg Leu Thr Leu Asn Gln Glu Glu Glu Lys Arg Arg Asn Ala Asp Ile
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Leu Asn Glu Lys Ile Arg Glu
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Ala Glu Asn Thr Met Leu Thr Ser Lys Leu Lys Glu Lys Gln Asp Lys
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Glu Ile Leu Glu Ala Glu Ile
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Asn Tyr Asn Asn His Leu Lys Asn Arg Ile Tyr Gln Tyr Glu Lys Glu
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Lys Ala Glu Thr Glu Asn Ser
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Leu Met Asp Met Gln Thr Phe Lys Ala
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Lys Val Ile Ser Pro Thr Lys Ala Leu
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Ser Ile Pro Thr Lys Ala Leu Glu Leu
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Leu Glu Leu Lys Asn Glu Gln Thr Leu
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Thr Val Ser Gln Lys Asp Val Cys Leu
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Ser Val Pro Asn Lys Ala Leu Glu Leu
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Cys Glu Thr Val Ser Gln Lys Asp Val
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Lys Ile Asn Gly Lys Leu Glu Glu Ser
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Ser Leu Val Glu Lys Thr Pro Asp Glu
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Ser Leu Cys Glu Thr Val Ser Gln Lys
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Glu Ile Asp Lys Ile Asn Gly Lys Leu
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Met Leu Leu Gln Gln Asn Val Asp Val
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Asn Met Trp Leu Gln Gln Gln Leu Val
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Phe Leu Val Asp Arg Lys Cys Gln Leu
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Tyr Leu Leu His Glu Asn Cys Met Leu
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Ser Leu Phe Glu Ser Ser Ala Lys Ile
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Lys Ile Thr Ile Asp Ile His Phe Leu
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Gln Leu Gln Ser Lys Asn Met Trp Leu
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Ser Leu Asp Gln Lys Leu Phe Gln Leu
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Phe Leu Leu Ile Lys Asn Ala Asn Ala
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Lys Ile Leu Asp Thr Val His Ser Cys
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Ser Leu Ser Lys Ile Leu Asp Thr Val
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Ile Leu Ile Asp Ser Gly Ala Asp Ile
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Lys Val Met Glu Ile Asn Arg Glu Val
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Lys Leu Leu Ser His Gly Ala Val Ile
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Ala Val Tyr Ser Glu Ile Leu Ser Val
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Lys Met Asn Val Asp Val Ser Ser Thr
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Val Leu Ile Ala Glu Asn Thr Met Leu
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Lys Leu Ser Lys Asn His Gln Asn Thr
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Ser Leu Thr Pro Leu Leu Leu Ser Ile
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Ser Gln Tyr Ser Gly Gln Leu Lys Val
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Lys Glu Leu Glu Val Lys Gln Gln Leu
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Gln Ile Met Glu Tyr Ile Arg Lys Leu
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Ala Met Leu Lys Leu Glu Ile Ala Thr
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Val Leu His Gln Pro Leu Ser Glu Ala
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Gly Leu Leu Lys Ala Thr Cys Gly Met
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Gly Leu Leu Lys Ala Asn Cys Gly Met
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Gln Gln Leu Glu Gln Ala Leu Arg Ile

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5

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Cys Met Leu Lys Lys Glu Ile Ala Met
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Glu Gln Met Lys Lys Lys Phe Cys Val
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Ile Gln Lys Ile Glu Leu Lys Ser Val
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Ser Val Pro Asn Lys Ala Phe Glu Leu
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Ser Ile Tyr Gln Lys Val Met Glu Ile
1 5

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Asn Leu Asn Tyr Gln Gly Asp Ala Leu
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Ala Val Gln Asp His Asp Gln Ile Val
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Leu Ile Ala Glu Asn Thr Met Leu Thr
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Phe Glu Leu Lys Asn Glu Gln Thr Leu
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Phe Glu Ser Ser Ala Lys Ile Gln Val
1 5

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Gly Val Thr Ala Glu His Tyr Ala Val
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Arg Val Thr Ser Asn Lys Thr Lys Val
1 5

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Thr Val Ser Gln Lys Asp Val Cys Val
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Lys Ser Gln Glu Pro Ala Phe His Ile
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Lys Asn Leu Ile Ala Glu Asn Thr Met
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Met Leu Lys Leu Glu Ile Ala Thr Leu
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Glu Ile Leu Ser Val Val Ala Lys Leu
1 5

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Met Leu Lys Lys Glu Ile Ala Met Leu
1 5

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Leu Leu Lys Glu Lys Asn Glu Glu Ile
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Ala Leu Arg Ile Gln Asp Ile Glu Leu
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Lys Ile Arg Glu Glu Leu Gly Arg Ile
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Thr Leu Lys Leu Lys Glu Glu Ser Leu
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Ile Leu Asn Glu Lys Ile Arg Glu Glu
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Val Leu Lys Lys Lys Leu Ser Glu Ala
1 5

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Gly Thr Ser Asp Lys Ile Gln Cys Leu
1 5

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Gly Ala Asp Ile Asn Leu Val Asp Val
1 5

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Glu Leu Cys Ser Val Arg Leu Thr Leu
1 5

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Ser Val Glu Ser Asn Leu Asn Gln Val
1 5

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Ser Leu Lys Ile Asn Leu Asn Tyr Ala
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Lys Thr Pro Asp Glu Ala Ala Ser Leu
1 5

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